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Justification for Upper Aquifer Investigation

A concern was raised that the 1995/96 upper aquifer investigation was unnecessary because the results were the same as those presented in the 1990 remedial investigation report. This document presents a justification for the upper aquifer investigation by listing the reasons the investigation was undertaken and the results that were achieved.

Reasons for the 1995/96 Upper Aquifer Investigation

The 1995/96 upper aquifer investigation was undertaken for the following reasons:

1. The USEPA/IDEM questioned the completeness of data regarding groundwater hydrology and contaminant distribution at the ACS site. Specifically, what was the nature and extent of groundwater contamination north, south, east, and west of the ACS site?

According to the most recent groundwater sampling data, only one well (MW-18) was found to contain water at concentrations below the required cleanup levels. USEPA did not oversee the collection of these samples. The samples were collected with bailers, which is a method that USEPA strongly disapproves of because it results in significant VOC losses. With only a single well outside the plume and sampling results based on a disapproved method, USEPA/IDEM questioned whether the data could be used to determine the nature and extent of groundwater contamination, as required in the Statement of Work.

2. The USEPA/IDEM did not have enough data to characterize the fate and transport of groundwater contamination. Before the 1995/96 upper aquifer investigation, available upper aquifer hydrogeologic data was limited to areas of known groundwater contamination. No piezometric data existed for the following areas:
 - North of the site, beyond the Grand Trunk railroad.
 - West of the site, beyond the wetlands.
 - East of the off-site containment area.
 - Southeast of the monitoring well MW-6 area.

Without this data, the fate and transport of groundwater contamination could not be adequately characterized.

At sites such as the ACS site, with significant quantities of dense, non-aqueous phase liquids (DNAPLs), site hydrogeologic data alone is insufficient to characterize fate and transport mechanisms. The direction of the DNAPL movement depends less on the direction of groundwater flow and more on gravity forces, viscous forces, and the dip of underlying strata. Therefore, DNAPL movement may be contrary to the direction of groundwater flow. At the ACS site, the top of the clay layer underlying the On-Site Containment area (the major DNAPL area) is 622 feet above mean sea level (AMSL). However, east of Colfax

Avenue, the top of the clay layer appears to dip 3 to 4 feet, to 618 to 619 feet AMSL. This may represent a potential eastward migration pathway.

The upper aquifer investigation was undertaken to these data gaps.

Results of the 1995/96 Upper Aquifer Investigation

The upper aquifer investigation consisted of a round of water level measurements, the installation of 11 piezometers, and the collection and analysis of 110 water samples. The groundwater samples were collected using a hydraulic probe. These are the most significant results of the 1995/96 upper aquifer investigation:

- Discovery of a new contaminated groundwater plume, southeast of monitoring well MW-6, which measured approximately 500 feet wide and 2000 feet long.
- Confirmation that groundwater contamination detected in monitoring well MW-6 was not a result of the Griffith Landfill underground storage tank, as purported in the August 1995 Pre-Design Work Plan. The UST was located in an area hydraulically downgradient of MW-6.
- Discovery of contaminant stratification in the upper aquifer west of the ACS property. Samples collected at the base of the aquifer (i.e., 10 feet below the water table) were an order of magnitude more concentrated than the samples collected at shallower intervals (i.e., 5 feet below the water table). This discovery raises several questions: 1) whether the contaminant stratification may be due to the fate and transport of DNAPLs, and 2) whether there exists a downward component of flow to the upper aquifer exists, transporting contaminants into the intermediate or lower aquifers.
- Identification of a groundwater seep area near piezometer P-63. The seep discharges to a drainage ditch. It has resulted in degradation to the surface water in the ditch and introduced an additional exposure pathway requiring remedial action.

Disclaimer

The groundwater contamination discussed in this memorandum is based on groundwater samples collected using hydraulic sampling probes. This data is considered QUALITATIVE DATA ONLY and thus cannot be related to defining the limits of contamination or the actual size of the groundwater plume.